

Magnitude 2.9 – South Carolina 2005 February 18 14:21:55 UTC

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On February 18, 2005, a magnitude 2.9 earthquake occurred near Columbia, S.C. At approximately 9:21 am several people in the South Carolina Geological Survey, located at 5 Geology Road, Columbia, SC 29212, felt this event. Most of the people here felt shaking lasting two to three seconds with some computer monitors noticeably shaking along with a loud boom. Originally thought to be a blast from a local quarry or the Lake Murray dam, after a few minutes, seismographs of the event were found via the web, and the event was identified as an earthquake and not a blast (see Figure 1).

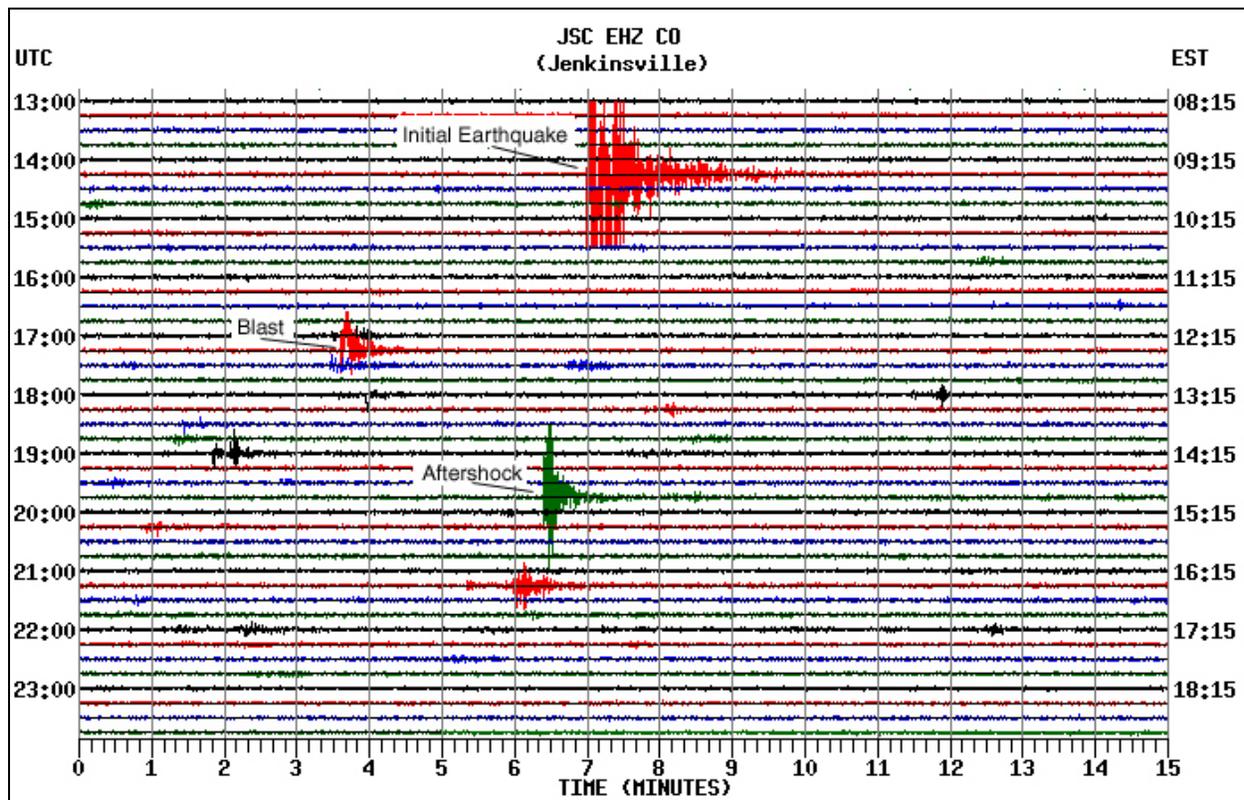


Figure 1. Jenkinsville seismograph for February 18, 2005. Main event at 9:22 am, as well as an aftershock felt by some at 2:51 pm. These displays digitally simulate actual seismograms that are routinely recorded at University of S.C. Time is indicated at the left end of the lines in Universal Time Coordinate (UTC or Greenwich) time and at the right end of the lines in local Eastern time. The quarry and mining activities in South Carolina, North Carolina, and Eastern Tennessee are regularly seen on these stations, as well as sonic booms, trains, and man-made blasts.

After confirming the findings when the United States Geological Survey (USGS) posted the preliminary results a few minutes later, a group of people from the South Carolina Geological Survey set out to investigate the findings, as the hypocenter (surface location of the epicenter, where the epicenter is the location of the earthquake below the surface) was located only a few miles from the Geological Survey building. Upon interviewing several people near the Broad River Road and St. Andrews Road Intersection in Columbia, S.C., where the hypocenter was originally located, we found that many people did not feel the earthquake. As we headed back towards the Geological Survey building, we did, however, find people who felt the earthquake.

As more data were analyzed, a new epicenter was located a few miles farther northeast in the Columbia North quadrangle (See Figure 2). Also, the fault associated with this earthquake is assumed to be a strike-slip fault, which correlated well with the interviews we gathered while investigating. Most of the people along this strike felt the earthquake, while the farther we got from the strike the fewer people we found who felt it. The South Carolina

seismic network final location for the February 18, 2005 earthquake placed the epicenter farther northwest in the Richtex quadrangle with a magnitude of 2.65.

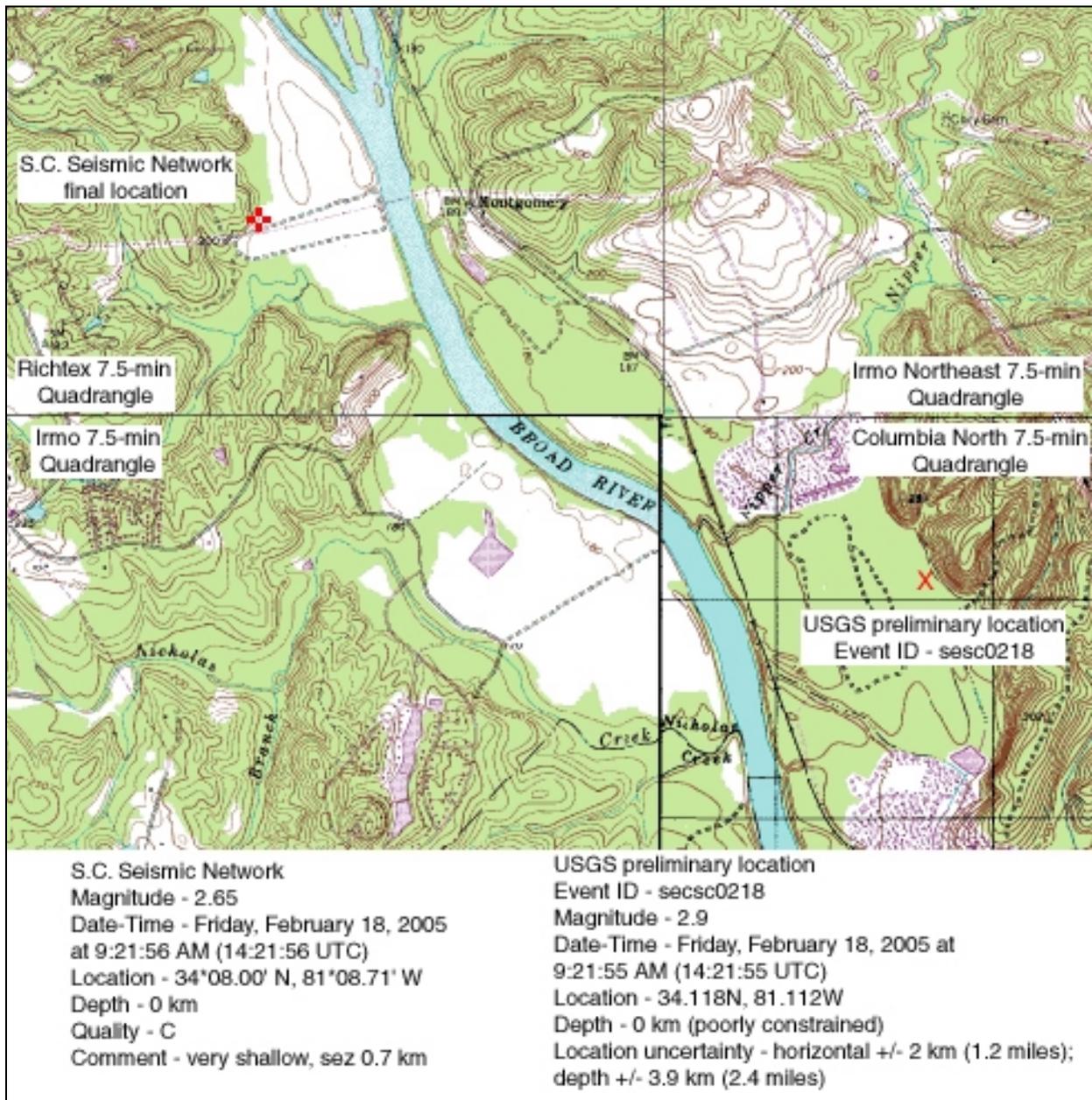


Figure 2. Preliminary earthquake report, southeast U.S. seismic network and the S.C. seismic network final report for the South Carolina earthquake on February 18, 2005.

(<http://earthquake.usgs.gov/recenteqsUS/Quakes/secsc0218.htm> and <http://scsn.seis.sc.edu/html/otherlat.html>)
Topographic map from www.topozone.com.

When the earthquake was announced by the local news stations, more surveys were completed via the web to gather data about the intensity of this event (<http://pasadena.wr.usgs.gov/shake/>). Intensity is a qualitative measure of the strength of ground shaking at a particular site, using earthquake effects such as, Did you feel the event?, Did any item move (i.e. furniture, pictures)?, and Your reaction to the event. The U.S. currently uses the Modified Mercalli Intensity Scale. Each earthquake large enough to be felt will have a range of intensities. Usually (but not always) the highest intensities are measured near the earthquake epicenter and lower intensities are

measured farther away. Roman numerals are used to describe intensities to distinguish them from magnitudes (See Table 1).

INTENSITY	I	II-III	IV	V	VI	VII	VIII	IX	X+
SHAKING	Not felt	Weak	Light	Moderate	Strong	Very Strong	Severe	Violent	Extreme
DAMAGE	none	none	none	Very light	Light	Moderate	Moderate/Heavy	Heavy	Very Heavy

Table 1. Modified Mercalli Intensity Scale

A total of 123 responses in 16 zip codes were gathered on the USGS website over the weekend after the event with an average maximum intensity of III (See Figures 3 and Table 2). The South Carolina Geological Surveys' own investigation gathered data from local individuals to help narrow the hypocenter of the earthquake and to see if any physical damage had occurred (See Table 3). Within the 29201 zip code, near Burlington Coat Factory on Broad River Road, people heard the boom associated with the earthquake but did not feel any shaking. In and around Irmo (29063), three people who were interviewed did feel the earthquake and gave the earthquake an intensity ranging from II to IV. The closer we came to Lake Murray Dam, the fewer people were found who felt the earthquake. Even though most people at the original calculated epicenter did not feel the earthquake, we found a few who did, and they reported the shaking to be mild to moderate, giving an average intensity of III. There were also a few who reported that they felt the earthquake downtown and also at the Columbia International University off Monticello Road. Also, at about 2:51:30 PM, February 18, 2005, three people felt an aftershock within the Geological Survey building. Pradeep Talwani, director of the South Carolina Seismic Network and Don Stevenson, SRS, deployed two portable seismographs (measuring vertical and horizontal ground motions) in the South Carolina Core Repository. Preliminary results indicate several minor aftershocks of the 2.9 earthquake on February 18, 2005. Monitoring will continue until the end of the month.

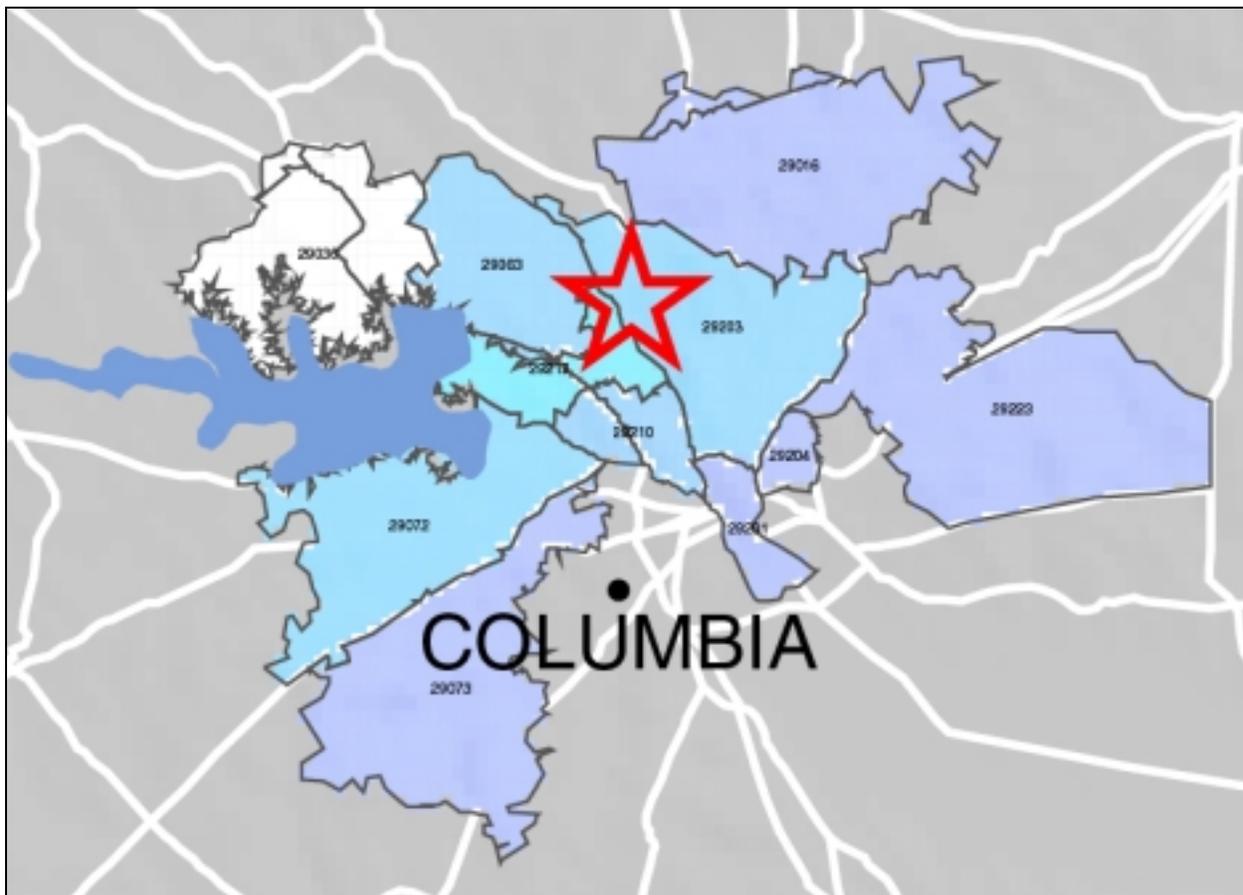


Figure 3. USGS community internet intensity map (5 miles ENE of Irmo, S.C.)
 ID: sc0218, 09:21:55 EST, FEB 18, 2005, Magnitude 2.9, Latitude N34.12, Longitude W81.11.

Statistics for event sc0218

Total reports: **121**
 Number of zip codes: **16**
 Maximum intensity: **III**

5 miles ENE of Irmo, South Carolina Mag: 2.9

Community name	Zip code	Ave. dist. (km)	Ave. intensity	Reports
FLETCHER (NC)	28732	192.98	III	1
BLYTHEWOOD (SC)	29016	14.10	II	1
CHAPIN (SC)	29036	20.62	I	1
IRMO (SC)	29063	8.74	III	24
LEXINGTON (SC)	29072	20.38	III	1
LEXINGTON (SC)	29073	27.60	II	2
SUMTER (SC)	29154	68.29	III	1
COLUMBIA (SC)	29201	16.55	II	6
COLUMBIA (SC)	29203	6.15	III	18
COLUMBIA (SC)	29204	14.30	II	2
COLUMBIA (SC)	29210	8.37	III	31
COLUMBIA (SC)	29212	6.78	III	24
COLUMBIA (SC)	29223	25.63	II	6
CHARLESTON (SC)	29406	166.44	II	1
CLEVELAND (SC)	29635	175.75	II	1
TAYLORS (SC)	29687	146.75	I	1

Table 2. Statistics for the February 18, 2005 South Carolina earthquake at 9:21:55 AM generated by the USGS earthquake hazards program.

Location of interviewee	Did they feel the earthquake	Other information
Bi-Lo, 3315 Broad River Road, Columbia, SC, 29210	No	
Rent-A-Center, 7200 Broad River Road, Irmo, SC, 29063	No	
Lawmen's Safety Supply, 3315 Broad River Road, Columbia, SC, 29210	No	
City Financial, 1629 Broad River Road, Columbia, SC, 29210	Yes, 2 people	Saw windows shaking
Public Library on Broad River Road, Columbia, S.C., 29210	No, 4 people	
Eckerd, 3100 Broad River Road, Columbia, SC, 29210	No	
Jackson Hewitt Tax Service, 3315 Broad River Road, Columbia, SC, 29210	Yes, 4 people	Saw windows and other objects shaking
Richland Memorial Hospital area, Columbia, S.C., 29203	Yes	
Embassy Suites Hotel, 200 Stoneridge Drive, Columbia, SC, 29210	Yes, 1 person	No other person felt it
Jim Hudson Mitsubishi, 310 Greystone Blvd., Columbia, SC, 29210	No, 2 people	
Dodgeland of Columbia, 190 Greystone Blvd., Columbia, SC, 29210	No, 5-6 people	
Resident in Hopkins, S.C., 29063	No	
Honda Cars of Columbia, 178 Greystone Blvd., Columbia, SC, 29210	No	
DHEC building on Bull Street, Columbia, S.C., 29203	No	
Burlington Coat Factory at Dutch Square Mall, 800 Bush River Road, Columbia, SC, 29210	No	Heard a loud noise
Dentist office on St. Andrews Road, Irmo, S.C., 29063	No, 3 people	
Law officer on Lake Murray Blvd., Irmo, S.C., 29063	No, 2 people	
Anderson, S.C.	No	
Spartanburg, S.C.	No	
Gas station at the 215/I-20 interchange	No	
Geological Survey Building, 5 Geology Road, Columbia, SC, 29212	Yes, 5+ people, 1 person did not feel it	Computer monitors shaking, heard a loud boom, 3 people also felt the aftershock around 2:51 pm.
141 Monticello Trail, Columbia, SC, 29203	Yes, 2 people	Heard a loud noise
Near the YMCA, 1501 Kennerly Road, Irmo, SC, 29063	Yes	Heard a loud noise
Netherland Drive, Irmo, S.C., 29063	Yes, 2 people	Ran outside to see what happened
Brook Pines Apartments, 169 Brook Pines Drive, Columbia, SC, 29210	Yes, 1 person	Noticed pictures move on wall
Columbia International University building, 7435 Monticello Road, Columbia, SC, 29203	Yes, 1 person	Ran outside, was on second story
Shareditch Road, Columbia, S.C., 29210	Yes, 2 people	Heard a loud noise and also ran outside

Table 3. Geological Survey field investigation results of the February 18, 2005, earthquake.